

BODAS Testbox TB3

RE 95092/02.10 1/12
Replaced: 04.07

Data sheet

Series 1
For software development on BODAS controllers RC



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Features

- Suitable for BODAS controllers RC of series 20, 21, 22 and 30
- Box housing for convenient transport with integrated lid compartment for cable and other accessories
- Integrated frequency generators and option of connecting external frequency generators
- Integrated switches and connections for external switch signals
- Integrated potentiometers and connections for external analog signals
- Option of connecting proportional solenoids
- Switched outputs and analog outputs
- Serial data interface or CAN (dependent upon the series of the RC controller) for diagnostics, parameter setting, display of process variables and programming
- CAN bus interfaces
- 2-mm bridges for individual wiring of potentiometers and analog inputs
- 4 mm laboratory connector system

Ordering code

TB	3	/	10
01	02		03

Type

01	Testbox	TB
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Design

02	for BODAS controllers RC of series 20, 21, 22 and 30	3
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Series

03	Series 1, Index 0	10
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Main components

Included in the standard delivery of the BODAS testbox TB3/10 for controllers RC series 20, 21, 22 and 30:

- TB3/10 in a transport case
- 3 bridge connectors (4mm)
- 51 bridge connectors (2mm)

The BODAS testbox TB3/10 is used to simulate vehicle and equipment functions for development and test purposes in conjunction with BODAS controllers RC.

The BODAS testbox TB3/10 is a development complement. It is just suitable for internal use or for usage in laboratory. The BODAS testbox TB3 is not suitable for an operational application in a machine.

The BODAS testbox TB3 has been developed specifically for the BODAS controllers RC series 20, 21, 22 and 30.

The permissible voltages, currents and frequencies correspond to the constraints of the BODAS controllers RC (see RE 95200, RE 95201, RE 95202, RE 95203, RE 95220).

The BODAS testbox TB3/10 is not intended for private purposes.

The designated use includes, that you have completely read and understood the operating instructions and especially chapter 2 „Fundamental safety instructions“.

Required components

You will need the following items to use the testbox TB3 with the BODAS controllers RC series 20, 21 and 22:

- **one testbox TB3**
- **power supply unit (12/24 VDC)**
to power the testbox and controller from a central point
- **TAK1 adapter cable**
to connect the BODAS controller RC of series 20 or 21.
- **TAK2 adapter cable**
to connect the BODAS controller RC of series 22.
- **proportional solenoids with 4-mm connectors**
to connect to the PWM outputs to simulate the connected load.

You will need the following items to use the testbox TB3 with the BODAS controller RC36-20 series 30:

- **two testboxes TB3**
- **power supply unit (12/24 VDC)**
to power the testbox and controller from a central point
- **Adapter kit RC36-20/30**
(contains adapter cable TAK4 and TB3 templates)
to connect a BODAS controller RC36-20 series 30
- **proportional solenoids with 4-mm connectors**
to connect to the PWM outputs to simulate the connected load

Optional accessories:

- Voltage and/or current measuring devices
- BODAS-service connecting cable to communicate with the serial interface or CAN interface of a PC or laptop

The cables listed above are available from Rexroth under the following material numbers:

- TAK1 adapter cable _____ R902076455
- TAK2 adapter cable _____ R902109508
- Adapter kit RC36-20/30
(TAK4 and two templates) _____ R902109578
- CAN USB adapter _____ R902602780
- BODAS-service connecting cable _____ R902109422
- BODAS-service _____ see RE 95086
- BODAS-design _____ see RE 95112
- C-API _____ see RE 95115

Description

The testbox TB3 is used to simulate vehicle and equipment functions for development and test purposes in conjunction with BODAS controllers RC.

The testbox TB3/10 is useful for

- software development using BODAS controllers RC,
- parameter setting of BODAS controllers RC with BODAS-design or BODAS-service
- and diagnostics.

The testbox TB3/10 allows you to simulate all the conditions of the overall system and to perform far-reaching functional tests of your control outside of the vehicle.

This reduces the development time of software and increases the safety and comfort. The testbox TB3/10 was developed specifically for the BODAS controllers RC. All inputs and outputs from these controllers can be configured via the testbox TB3/10. A controller RC 36-20/30 needs to be connected with two BODAS testboxes TB3/10.

The permissible voltages, currents, and frequencies correspond to the constraints of the BODAS controllers.

The testbox TB3 offers interfaces for connecting proportional solenoids and all inputs of the controller. This allows for a complete simulation of the application – from the control of proportional solenoids to cable break.

The testbox TB3/10 provides various input signals for the BODAS controller RC.

If necessary, signal generators or speed sensors can be connected to the testbox TB3/10. The signals are transmitted to the BODAS controller RC. The output signals of the BODAS controller RC are indicated via LEDs and can be tapped at the corresponding measuring sockets.

The diagnostics interface allows connecting a PC or laptop with the PC software BODAS-service or BODAS-design.

CAN bus interfaces can be used to communicate with other bus users, e.g. with additional BODAS controllers RC or a joystick.

The power supply and switch inputs are protected against overcurrent.

The testbox is easy to transport, because of the transport case including a space in the cap for cables and other complements.

Controls and indicators

Controls / ports	TB3 label	Number	Function	Chapter
Switch for voltage supply to controller and TB3 test box	TB3 supply	1	On / Off	7.1
Switch for ignition simulation	Ignition switch	1	On / Off	8.5.1
Switch for supplying the outputs on the controller	Supply outputs	1	On / Off	
Switches for switch inputs	Digital inputs	14	Supply voltage (+) / open / ground (-)	8.3.1
Pin for switch inputs		14	Switch signal measurement or external switch signal input	
Pin for analog inputs	Analog inputs	11	Voltage input 0 ... 5 V	8.3.2
			Plugboard with 2 mm bridges Voltage measurement or external voltage input	
Pin for analog inputs (on RC/20 and RC/21: current inputs, designations explained below)		4	Voltage input 0...8 V ¹⁾ Current input 0...20 mA ³⁾	
			Plugboard with 2 mm bridges Voltage measurement or external voltage input (on RC/20 and RC/21 accordingly for current)	
Potentiometer for analog inputs (5 kΩ)		15	Simulation of analog inputs	
Pin for temperature inputs	Temperature	2	Plugboard with 2 mm bridges Measurement of resistance or connecting an external resistor	
Potentiometer for temperature inputs (2 kΩ)	Temperature inputs	2	Temperature sensor simulation ¹⁾ (precision potentiometer)	
Frequency generators	Frequency generator	4	Speed measuring simulation (1.7 Hz – 9.1 kHz, square-wave signal) Setting and output of internally generated or input frequency signal, optionally processable as DSM signal: direction data, error signal generation	8.1
		2	Speed measuring simulation (1.7 Hz – 4.55 kHz, square-wave signal) Setting and output of internally generated or input frequency signal, for HDD2 simulation two signals with a phase shift of ± 90° for direction of rotation detection	
Pin for frequency inputs	Frequency inputs	5	Input of an internally generated or external frequency signal (transmission via 4 mm lab measurement cables)	
Pin for current measurement input at PWM outputs	PWM lowside	6	Current measurement inputs for PWM outputs, pin for return wire from proportional solenoids ²⁾	8.4.2
LED for current measurement inputs		6	Current measurement inputs indicator ⁴⁾	

Controls and indicators

Controls / ports	TB3 label	Number	Function	See chapter
LED and pins for switched outputs (Highside)	Digital output highside	4	Indicator and measurement of switched outputs ^{1) 4)}	8.4.2
LED and pins for switched outputs (Lowside)	Digital output lowside	4	Indicator and measurement of switched outputs ^{1) 4)}	
LED and pins for "Low power" switched outputs (Highside)	Digital low power	2	Indicator and measurement of "Low power" switched outputs ^{1) 4)}	
Pins for current outputs to proportional solenoids (Highside) (on RC/20 and RC/21 as switched outputs, designations explained below)	PWM highside	12	Output current measurement, proportional solenoid outputs	8.4.1
LED for current outputs (Highside)		12	Current outputs indicator ⁴⁾	
Pins for analog outputs (voltage)	Analog out	2	Measurement of output voltage	8.4.4
Connector for BODAS service diagnostic cable, Cannon Trident, 8-pin	Diagnosis	1	Communication / Service / Programming (RS232 and CAN1)	-
Connector for CAN bus, SUB 9-pin	CAN1, CAN2	2	Communication Pin 7: CAN high, Pin 2: CAN low	8.5
Connections for power supply unit (12V or 24V DC)	+12V/+24V ECU, TB3	2	Voltage supply for test box and controller	8.3.2 6.2
Connections for power supply unit (ground)	GND ECU, TB3	2	Central ground	6.3 7.1
Battery voltage connection (voltage according to the supply)	Battery	4	Voltage supply of external signal transmitters, solenoids or for enabling or disabling (depending on series) the output stages (INH)	8.3.3
Ground pins	Ground	8	Reference potential for external sensor or measuring devices	
Port for internal activation or deactivation (depending on series), Inhibit	INH	1	Internal activation / deactivation of power outputs RC/20, RC/30: level > 5V, activation of output stages RC/21, RC/22: level > 5V, deactivation of output stages	8.4.5
Circuit breaker	F2 (20 A)	1	Fuses for battery sockets 4 in connection panel	-
Glass tube fuse	F1 (10 A)	1	Fuse TB3 internal	-
Connector plug for the adapter cable to the BODAS RC controller, Harting HAN108DD	---	1	Port for adapter cable TAK1	4.2 6.2

¹⁾ BODAS controller RC serie 22 only

²⁾ BODAS controller RC series 21 and 22 only

³⁾ BODAS controller RC series 20 and 21 only

⁴⁾ LEDs glow dimly when the power outputs are enabled. Even if no output is actuated.

Please note the following with the respect to the table of connections:

The designations on the TB3/10 test box are matched to the inputs and outputs on a BODAS controller RC serie 22. For the BODAS controllers RC series 20 and 21 these do not correspond exactly. On the BODAS controller RC36-20/30, the correct designation of the inputs and outputs is ensured by the template supplied in the adapter kit.

The designations, which differ from the actual assignment if connecting a controller RC series 20 and 21, can be found in the appropriate operating instructions under „Connection designation for BODAS controllers RC series 20 and 21“.

Controls and connections

Plugboard for potentiometers of analog and temperature inputs

Sockets for inputs and outputs, ground and operating voltage

Diagnostics and CAN connections, voltage supply

LED indicator for outputs

Frequency generators

Switches for switch inputs

Connector plug for TAK1 or TAK2 adapter cable

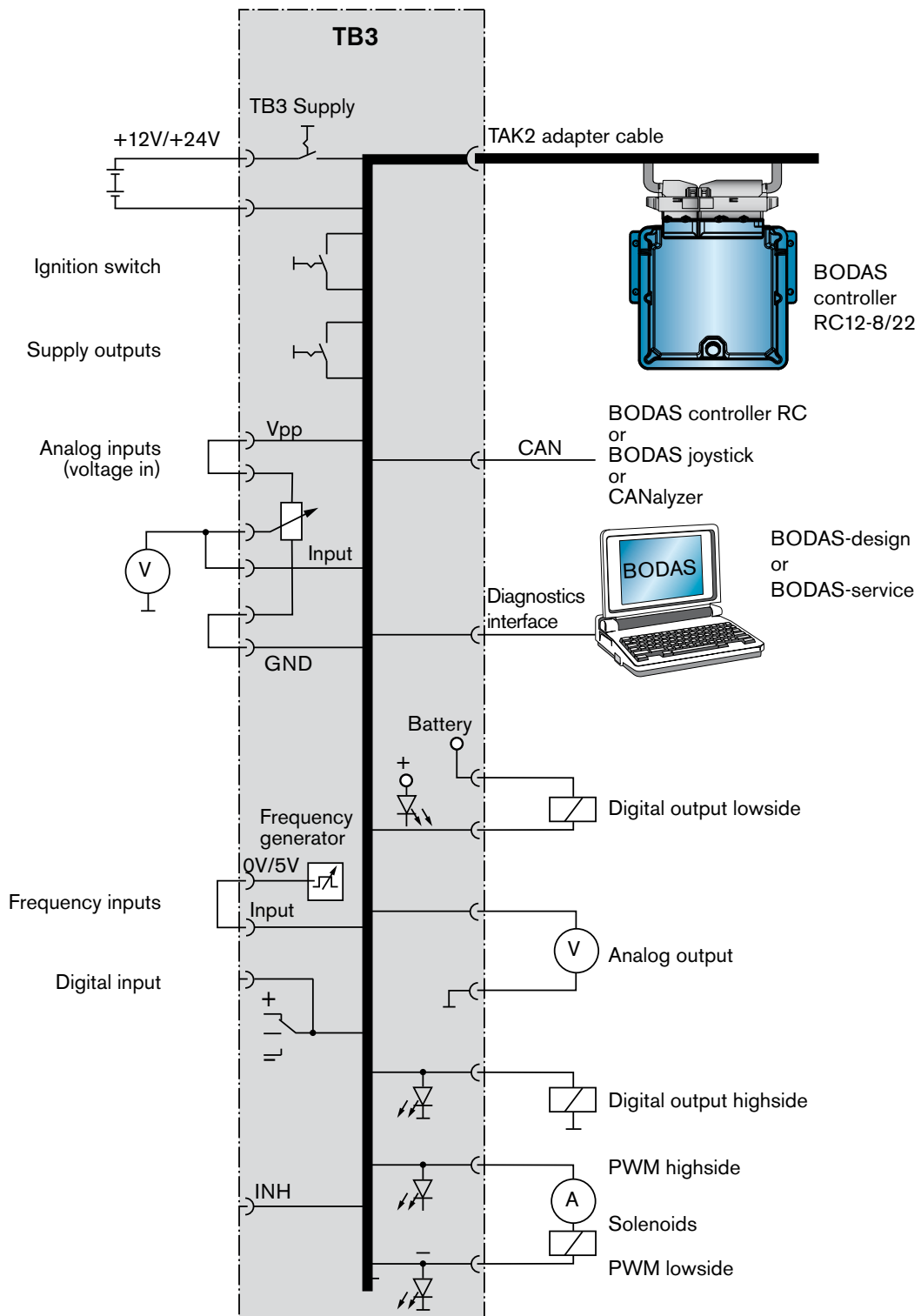
Potentiometers for analog and temperature inputs

Power switch, ignition switch, main switch, fuses



Connection example

This diagram shows an example of the connection options offered by the testbox TB3.



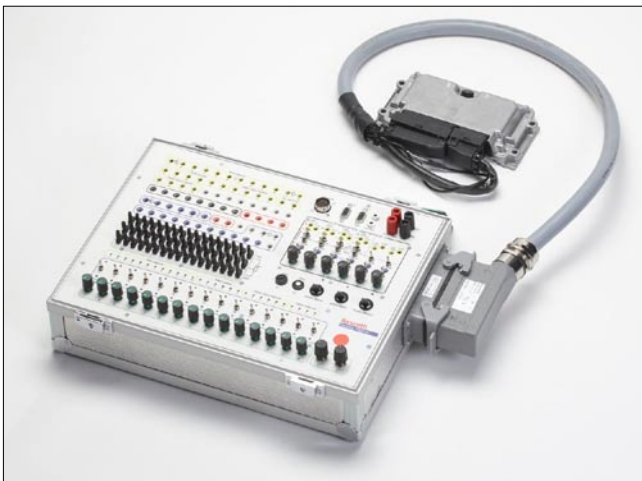
Assembly of BODAS adapter cable TAK

Adapter cable TAK1 for connecting a BODAS controller RC series 20 and 21 with the testbox TB3/10 (R902109508).

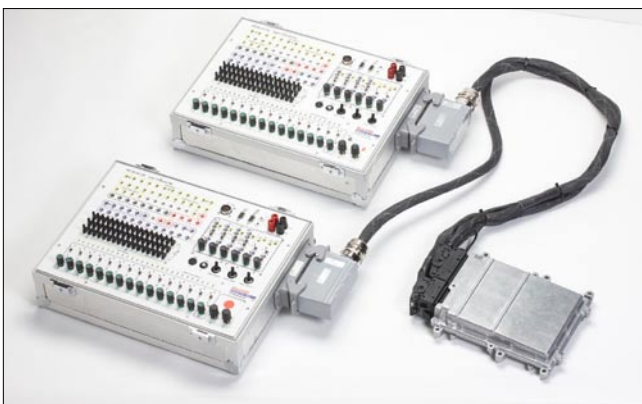
Adapter cable TAK2 for connecting a BODAS controller RC series 22 with the testbox TB3/10 (R902109508).



Adapter cable TAK1/TAK2

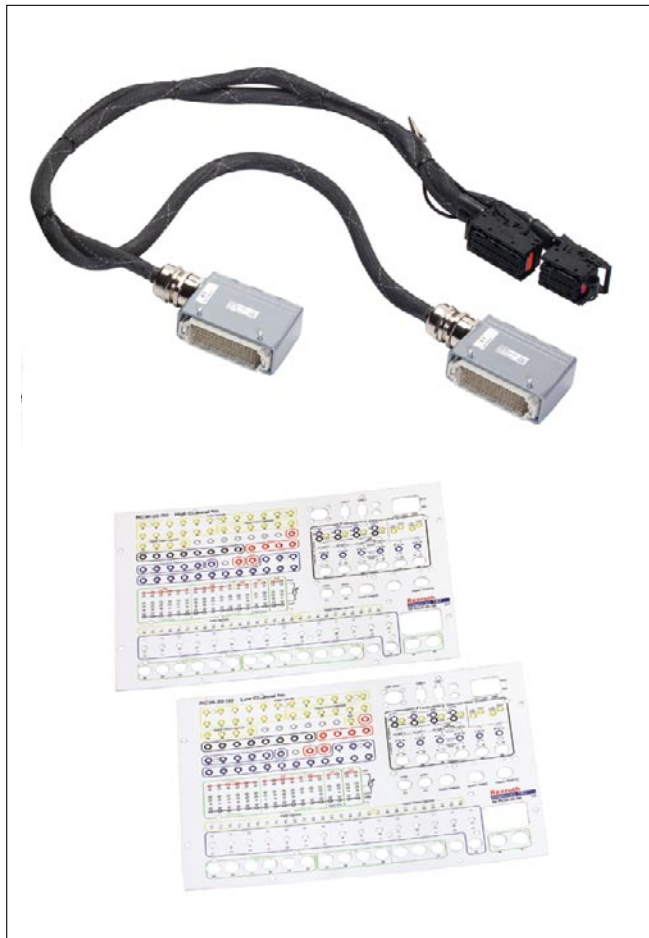


Controller RC series 20 connected via TAK1 with a BODAS testbox TB3/10



Controller RC36-20/30 connected via TAK4 with two BODAS testboxes TB3/10.

Adapter kit RC36-20/30 (TAK4 and two templates) for connecting a BODAS controller RC36-20/30 with two testboxes TB3/10 (R902109578)



Adapter kit for BODAS controller RC series 30

Indication:

1. The BODAS TAK1/2 resp. adapter kit RC series 30 does not provide EMC protection via shielding or twisting.
2. The BODAS TAK1/2 resp. adapter kit RC series 30 has the protection class IP20.
3. The BODAS TAK1/2 resp. adapter kit RC series 30 is designed for operational and storage temperature between 0°C and +40°C.

Notes

Notes

Notes

Safety instructions

- The suggested circuits do not imply any technical liability for the system on the part of Rexroth.
- The BODAS TB3 test box must be connected while in a voltage-free state.
- Before switching on the BODAS controller with the BODAS TB3 test box, ensure that no safety-critical situations could arise through control of the outputs.
- To switch off the system in emergencies, the power supply to the electronics must be disconnected with a safety switch.
- The BODAS TB3 test box may only be operated by trained staff.
- The safety measures provided in RE 95200, RE 95201, RE 95202 and RE 95203 and the particular BODAS RC operating instructions / safety notes are to be observed.
- The general conditions for deliveries of Bosch Rexroth AG apply.
- The waste management of BODAS testbox, the adapter cable and the adapter kit needs to be completed by skilled person.
- A sufficiently large distance to radio systems must be maintained.
- All connectors must be unplugged from the electronics during electrical welding operations.

Further notes:

Further information to BODAS products can be find under www.boschrexroth.com/mobile-electronics „BODAS Tools“.

Visit our web page regularly to inform about current product information and updates.